

(19)



Europäisches Patentamt

European Patent Office

Office européen des brevets

(11) Publication number:

0 240 104

A1

(12)

EUROPEAN PATENT APPLICATION

(21) Application number: 87300591.2

(51) Int. Cl.³: B 66 F 9/06
B 62 B 1/14

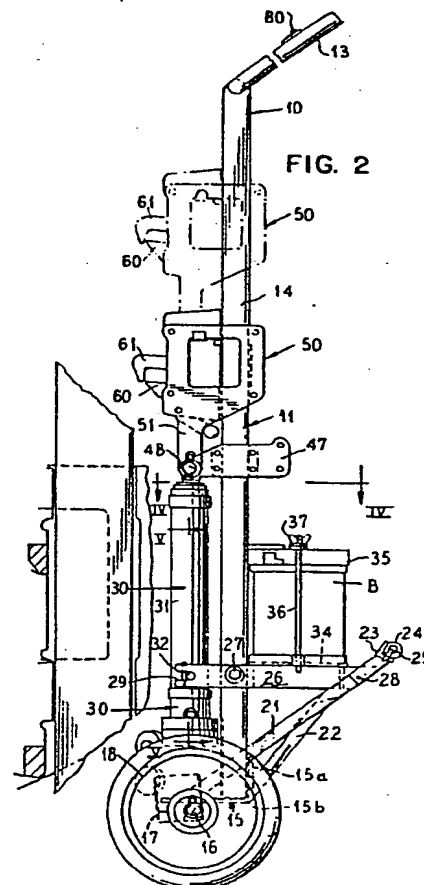
(22) Date of filing: 23.01.87

(30) Priority: 03.04.86 US 847534

(43) Date of publication of application:
07.10.87 Bulletin 87/41(84) Designated Contracting States:
DE FR GB IT NL SE(71) Applicant: LIFTOMATIC MATERIAL HANDLING, INC.
2224 Cleveland Street
Evanston Illinois 60202(US)(72) Inventor: Berg, Bruce A.
301 Brampton Lane Lincolnshire Woods
Lake Forest Illinois 60045(US)(74) Representative: Oliver, Roy Edward et al,
POLLAK MERCER & TENCH High Holborn House 52-54
High Holborn
London WC1V 6RY(GB)

(54) Powered drum lifting truck.

(57) A two-wheeled drum truck slidably mounts a drum flange or chime (C) clamp (60, 61) which is powered from an energy source on the truck to raise the drum (D) for depositing the same on a pallet (P) or the like. An electric motor (40) driven linear actuator (43) on the truck is energized from a batter (B) also carried on the truck to drive the clamp. A double pole switch (80) on or adjacent the handlebar (13) of the truck controls a circuit to drive the motor in either of two opposite directions. The clamp automatically locks the drum to the truck when raised against the chime ring of a barrel or drum. Rollers (19) on the truck embrace and cradle the drum, so that it is easily raised and lowered on the truck.



EP 0 240 104 A1

BEST AVAILABLE COPY

-1-

POWERED DRUM LIFTING TRUCKDESCRIPTION

5 This invention relates to the art of hand operated two-wheeled drum trucks and specifically relates to such trucks equipped with power mechanism to raise and lower a drum thereon for facilitating depositing the drum on a raised pallet or the like.

10 Hand operated two-wheeled drum trucks with gripping jaws engaging the bead or top chime of a drum are known in the art, but can only tilt the drum off of the ground for transport. The wheels provide the tilting fulcrum and even when the drum is inclined in a maximum transporting angle its bottom rear portion cannot clear a raised pallet or the like and the drum must be tilted
15 over the edge of the pallet, released from the truck, and rocked into position on the pallet. It would be an improvement in this art to provide a drum truck which raises the drum to a desired height for depositing on pallets or the like raised supports. It would be a
20 further improvement in this art to raise the drum on the truck by means energized from a battery carried on the truck. This invention now provides these improvements.

According to this invention there is now provided a hand operated two-wheeled drum truck carrying
25 its own power means to raise and lower the drum on the truck. The truck has a transversely extending bottom frame mounting laterally spaced wheels and having a central elongated upright bar or beam with a handle on its upper end. Rollers on the frame embrace and cradle a
30 drum to be mounted thereon. The rollers rotate on horizontal axes so that the drum may be moved longitudinally on the frame. The upright frame bar slidably mounts a clamp with gripping jaws engaging the upward chime ring or bead of a drum cradled by the rollers. An
35 electric motor driven linear actuator is mounted on the frame in front of the upright bar and is coupled to the clamp to raise and lower it along the length of the bar.

-2-

An electric battery is mounted behind the upright bar to energize the actuator and a switch is provided at the handle for actuating the motor in opposite directions to selectively raise and lower the clamp. A foot step
5 is provided at the rear of the frame to be pressed by the foot of the operator for tilting the frame about the wheels.

The truck is pushed in a vertically upright position against the side of a drum to be transported
10 with the rollers embracing the drum. The actuator is energized through the switch to position the clamp at a level so that its jaws embrace the top chime or bead of the drum. The clamp is then further raised to trigger the jaws into locked engagement with the chime or bead,
15 the frame is tilted by the operator, the switch is again manually operated to raise the drum to a desired height on the truck, the truck is wheeled to the location for depositing the drum, such as on a pallet, the frame is then again tilted to an upright position with the drum
20 clearing the pallet, the clamp is then lowered to deposit the drum on the pallet and the jaws are released from the chime whereby the truck is freed to be moved away from the pallet.

It is then an object of this invention to
25 provide a two-wheeled hand operated drum truck or dolly which is powered to raise and lower the drum on the truck to facilitate receiving a drum at one level and depositing it at another level.

Another object of the invention is to provide
30 a two-wheeled drum dolly which cradles a drum for longitudinal movement and carries power means to cause such movement.

Another object of this invention is to provide a drum truck with a drum chime engaging clamp that is
35 raised and lowered by power means on the truck.

A specific object of the invention is to provide a two-wheeled hand operated drum truck with a

-3-

battery, an electric motor driven linear actuator and a drum chime clamp driven by the actuator automatically locking a drum on the truck.

Other and further objects of this invention
5 will become apparent to those skilled in this art from the following detailed description of the annexed sheets of drawings which illustrate a best mode embodiment of the invention.

FIG. 1 is a perspective view of a two-wheeled
10 drum truck of this invention showing the drum in raised position approaching a pallet to receive the drum.

FIG. 2 is a side elevational view of the drum truck of this invention illustrating in dotted lines a raised position of the drum clamp.

15 FIG. 3 is an enlarged broken vertical sectional view with parts in side elevation of the drum clamp in opened position.

FIG. 4 is a horizontal sectional view along the line IV-IV of FIG. 2.

20 FIG. 5 is a vertical sectional view, with parts in elevation, along the line V-V of FIG. 2.

FIG. 6 is a horizontal sectional view taken along the line VI-VI of FIG. 5.

25 FIG. 7 is an enlarged broken side elevational view of the clamp of FIG. 3 in closed position.

FIG. 8 is a cross-sectional view along the line VIII-VIII of FIG. 7 with parts in elevation.

FIG. 9 is a side elevational view of the truck in position for receiving a drum.

30 FIG. 10 is a view similar to FIG. 9, but illustrating the raised position of the clamp locked to the top chime ring or bead of the drum.

FIG. 11 is a view similar to FIG. 10, but illustrating the truck tilted upright from the position
35 of FIG. 1 and depositing the drum on the pallet.

FIG. 12 is a fragmentary front elevational view of the lower portion of the truck.

-4-

FIG. 13 is a rear elevational view of the lower portion of the truck.

FIG. 14 is a diagram of the energizing circuit.

ON THE DRAWINGS

5 In FIG. 1, the drum truck 10 is illustrated in inclined position carrying a drum D in elevated position and approaching a pallet P to deposit the drum thereon.

As shown in FIGS. 1, 2, 4, 12 and 13, the truck 10 has a main frame 11 with laterally spaced wheels 12 on the bottom end thereof and a handle bar 13 on the top end thereof.

The frame 11 includes a central upright square tube bar or beam 14 having the upstanding leg 15a of a transverse angle plate welded to the bottom portion thereof. The plate 15 has a forwardly projecting horizontal leg 15b providing a platform carrying axles 16 which are welded to the underface of the outboard end portions of the leg 15b and project laterally therefrom in slightly downwardly inclined position to mount the wheels 12 at a camber angle for ease in tracking.

The forward edge of the platform leg 15b has a notch or recess 15c in the midsection thereof with a bottom or inner end parallel to the upstanding flange 15a and diagonal sidewalls extending from this bottom to the forward edge of the platform leg.

An upstanding plate 17 fitting this notch or recess is welded to the platform leg 15b and has angled upright wings 17a to which are bolted upright brackets 18, each rotatably mounting a pair of superimposed rollers 19 on horizontal axles 20. Since the wings 17a of the upright plate 17 are laterally inclined and since the brackets 18 are bolted to these wings, the rollers 19 converge toward each other and the angles of conversion are such as to intersect at the axis of a standard size 50-gallon drum cradled on the rollers. The angle of conversion is thus such as to cause the rollers to cradle the periphery of the drum and, of course, drums having

-5-

diameters greater or less than a standard 50-gallon drum will still be amply cradled by the rollers. Since the rollers rotate on horizontal axes, the drum is supported for longitudinal movement on the truck.

5 A pair of spaced parallel straps 21 are welded at their forward ends to the platform leg 15b of the angle plate 15 and inclined upwardly and rearwardly therefrom over the vertical leg of the plate to which they can also be tack welded. The angle of inclination
10 is about 45° from the leg 15b.

A pair of rigidifying strut straps 22 have forward ends welded to the upstanding leg 15a of the angle plate 15 and rearward ends welded to the straps 21 forwardly from the rear ends of these straps.

15 The rear ends of the straps 21 are connected by an angle iron crossbar 23 and a hollow rubber or plastic tube 24 is cradled in this angle bar 23 and mounted on an axle bolt 25 secured to the angle iron. This tube 24 provides a step conveniently pressed or
20 pushed by the foot of an operator for tilting the frame 11 of the truck about the axis provided by the axles 16 of the wheels 12 to easily incline the truck from an upright vertical position to an inclined traveling position.

25 A pair of frame strips 26 are bolted intermediate with their ends to the side faces of the upright beam bar 14 as shown at 27 and project horizontally both forwardly and rearwardly of the beam 14 with their rear ends pinned at 28 to the straps 21. The
30 forward ends of the members 26 are horizontally bifurcated as indicated at 29.

An electric motor driven nut linear actuator unit 30 has an upright tubular casing 31 with laterally projecting trunnions 32 received in the yokes 29 and held
35 therein by bolts 33. The unit 30 is thus mounted forwardly of the beam bar 14 above the platform 15b of the angle frame 15.

-6-

A support plate 34 for an electric battery B is mounted on top of the frame members 26 between the beam 14 and the rear ends of the straps 21. The battery B rests on the plate 34. A frame 35 embraces the top of the battery B and bolts 36 straddle the battery and have bottom ends secured in the plate 34 and top ends slidably receiving the frame 35 with wing nuts 37 threaded thereon to clamp the battery between the bottom plate 34 and the frame 35.

10 As shown in FIG. 5, the actuator unit 30 has a bottom casing 38 on the bottom of the frame tube 31 housing gearing connecting the drive shaft 39 of an electric motor 40 mounted upright on the casing through a slip clutch 41 with a driven shaft 42 into an upright ball screw assembly 43. A conventional ball nut 44 on 15 this screw 43 traverses the length of the screw to raise and lower a cylinder 45 telescoped in the tubular casing 31. A brake assembly 46 is provided to lock the screw 43 in fixed position when the motor 40 is 20 deenergized.

A slide bracket 47 (FIG. 2) rides on the bar beam 14 and mounts a transverse pin 48 extending through a lug 49 on top of the cylinder 45. A latch frame 50 slidable on the bar beam 14 above the bracket 47 has 25 dependent fingers 51 straddling the bracket 47 and also pinned to the pin 48.

The latch frame 50 houses a pair of barrel chime engaging pivoted jaws 60 and 61 shown in FIGS. 3 and 7. The bottom jaw 60 pivots on a pin 62 supported 30 by the frame 50 and has a pointed chime engaging edge 63 projecting from the frame and a tail 64 in the frame. The bottom face of the tail 64 has a notch 65 into and out of which rides the nose 66 of a gravity actuated weight 67 pivoted at 68. The top jaw 61 is pivoted on 35 a pin 69 carried by straddling straps 70 which are pinned at 71 to the upper end portion of the frame 50.

-7-

The forward end of the jaw 61 has a hook portion 72 for projecting into the periphery of an exposed top chime on the drum. The tail end of the jaw 61 has a bottom edge 73 riding on the tail 64 of the jaw 60 and a top edge 74 pressed by a spring-loaded pin 75 to maintain contact between the edge 73 and the tail 64. This pin 75 rides in a housing 76 in the frame 50 and is free to tilt with the spring 77 embracing the pin being compressed to load it against the top edge 74 of the jaw 61. The clamp arrangement is such that when the pointed end 63 of the lower jaw 60 engages the bottom of a drum flange or chime ring C, as illustrated in FIG. 7, and is depressed thereby, the tail end 64 thereof will swing upwardly causing the edge 73 of the jaw 61 to swing upwardly, thereby pivoting the jaw 61 on the strap 70 and depressing its hook nose 72 into the inner periphery of this chime ring C and clamping the jaw to the drum. As the bottom jaw 60 swings downwardly the nose of the weight member 67 will ride into the notch 65, thereby locking the jaws in their clamped position.

As illustrated in FIG. 14, a double pole switch 80 mounted on the handlebar 13 of the truck frame controls a circuit 81 between the battery B and the reversible motor 40 of the actuator assembly 30. This switch 80, convenient to the hands of an operator grasping the handlebar 13, is activated in opposite directions to cause the motor 40 to raise or lower the clamp 50.

As shown in FIG. 9, a drum D resting on a floor F and having a top chime ring C is approached by the truck 10 in an upright position with the cradling rollers 19 projecting forwardly of the wheels 12 being pushed against the lower portion of the drum. The switch 80 is activated to move the clamp 50 to a level on the frame beam 14, such that the jaws 60 and 61 straddle the chime ring C.

Then, as shown in FIG. 10, the switch 80 is

-8-

again manipulated by the operator to further raise the clamp 50 forcing the lower jaw 60 against the bottom of the exposed chime ring C and automatically triggering the top jaw 61 so that its hook portion 72 enters the inner periphery of this chime ring and the downward swinging of the pointed end 63 of the jaw 60 raises its tail 64 so that the weight block 67 will enter the notch 65, thereby locking the jaws in their chime ring clamping position as shown in FIG. 7. Next, the operator conveniently presses down on the step 24 tilting the truck to a transporting position as illustrated in FIG. 1, whereupon further raising of the clamp assembly 50 lifts the drum to an elevated position above the wheels 12.

The drum on the tilted truck is easily transported to a pallet P with the drum at a level clearing the top of the pallet. The truck is then conveniently tilted back to an upright position, shown in FIG. 11, with the drum over the pallet, whereupon the clamp 50 is lowered by again activating the actuator 30, thus depositing the drum on the pallet.

The weight block 67 is then released from the notch 65 permitting the jaws to separate and freeing them from the chime C.

From the above descriptions it will therefore be clear to those skilled in this art that the drum trucks of this invention are powered from an energy source on the truck to manipulate a drum chime clamp locking the drum to the truck and raising it to a desired level for convenience in depositing the drum on a pallet or the like.

It will be understood that variations and modifications may be effected without departing from the spirit and scope of the novel concepts of the present invention.

-9-

CLAIMS:

1 1. A manually operable drum truck having at least
two wheels (12), a frame (11) for supporting a drum (D),
a handle (13) and a drum chime clamp (60,61) for
securing the drum, characterised in that power means
5 (40,43) are provided on the frame for raising or
lowering the clamp, an energy source (B) is provided for
operating the power means on the frame and a switch (80)
is provided for actuating the power means to raise or
lower the clamp.

10 2. A drum truck according to claim 1, wherein the
power means comprise an electric motor (40) driven
linear actuator (43) and the energy source is an
electric storage battery (B).

15 3. A manually-operable drum truck having a frame
(11) characterised by drum cradling rollers (19), a drum
chime clamp (60,61) slidable on the frame, power means
(40,43) on the frame for raising and lowering the clamp,
a battery (B) on the frame for energizing the power
means, a handle (13) on the frame and a switch (80)
20 adjacent the handle for driving the power means to raise
or lower a drum (D) held by the clamp.

4. A drum truck according to claim 3, wherein the frame
(11) has an upstanding tubular beam (14) with the handle
(13) on its upper end, a transverse base (15) on its
25 lower end, wheels (12) on the outboard ends of the base
and a bracket (50) housing the clamp embracing the tube.

5. A manually-operable drum truck which comprises
a frame (11) having an upright beam (14), a handle (13)
on the top end of the beam, a transverse base (15) on
30 the bottom of the beam and wheels (12) supporting the
base above ground characterised in that rollers (19) are
mounted on the base for cradling a drum (D) for movement
longitudinally of the frame, a drum clamp (60,61) is
slidable on the upright beam, an electric motor (40)
35 driven linear actuator (43) is mounted on the base to

-10-

1 raise or lower the clamp on the upright beam, a battery
(B) is mounted on the frame rearwardly of the actuator
and a step (24) is mounted on the frame rearwardly of
the battery for tilting the frame on the wheels, the
5 clamp having a pair of chime ring engaging jaws (60,61)
spring biased to an opened position, for straddling the
chime ring (C) of a drum (D) cradled on the rollers, and
the jaws being arranged to swing to a closed position to
clamp the chime ring (C) on the frame, when the clamp is
10 raised by the power means to lift the drum on the
rollers.

6. A drum truck according to claim 5, wherein the
transverse base has axles (16) projecting from the
outboard ends thereof in downwardly-inclined relation
15 and the wheels are rotatably mounted on the axles.

7. A manually-operatable two-wheeled drum truck
comprising a frame (11) having an upright central bar
(14), a handle (13) on the upper end of the bar, a
transverse base (15) on the lower end of the bar and a
20 pair of wheels (12) for supporting the base above ground
level, characterised in that rollers (19) project
forwardly from the base for cradling a drum (D), a
drum chime ring clamp (60,61) is slidably mounted on the
bar between the base and the handle, an electric motor
25 (40) driven linear actuator (43) is mounted on the base
for driving the clamp along the bar, a foot step (24)
projects rearwardly from the base to facilitate tilting
of the frame on the wheels, a battery (B) being mounted
on the frame above the step and a switch (80) being
30 mounted on the frame adjacent the handle, and a circuit
including the battery, the switch and an electric motor
is provided, for driving the clamp in either direction
on the bar, the clamp having chime ring engaging jaws
(60,61) for straddling and then clamping the chime ring
35 (C) of a drum cradled on the rollers, whereby the truck

-11-

1 may be pushed in an upright position against a drum to
cradle the drum (D) on the rollers (19), the clamp may
be driven to a level on the bar to straddle the top
chime ring of the drum with the jaws and then raised, to
5 lock the jaws to the chime ring and lift the drum, and
the step may be depressed by an operator to tilt the
drum to a transporting position.

8. A drum truck according to claim 7, wherein the
power means comprise an electric motor (40) driven ball-
10 nut linear actuator (43).

9. A drum truck according to claim 7 or 8, wherein
the rollers are rotatably mounted upright on the base
and arranged such that in use their planes of rotation
intersect in the region of the longitudinal axis of the
15 drum being cradled thereby.

10. A drum truck according to claim 7, 8 or 9,
wherein the jaws include a pivoted lower jaw (60) with a
pointed end (63) for engaging the bottom of the chime
ring, a pivoted upper jaw (61) with a hook end (72) for
20 engaging the inner periphery of the chime ring, a
spring-loaded pin (75) for pressing the jaws into an
open position and a pivoted gravity-actuated weight (67)
riding on the lower jaw, for securing the jaws in a
clamped closed position when the lower jaw is pivoted
25 downwardly after engaging the chime ring.

11. A drum truck according to claims 7 to 10,
wherein the transverse base (15) includes a platform
with an upright rear flange (15a) and a horizontal flange
(15b) projecting forwardly therefrom, means securing the
30 bottom end of the central bar to the upright flange,
wheel axles (16) secured to the horizontal flange and
projecting laterally therefrom, a recessed notch (15c)
in the central portion of the front end of the horizontal
flange, an upstanding plate (17) secured in this recess,
35 upstanding brackets (18) on the ends of the plate and

-12-

1 horizontal pins (20) on the brackets rotatably mounting
such rollers.

12. A drum truck according to claim 11, wherein
the pins (20) are oriented to direct the rollers toward
5 the axis of a drum to be cradled thereon.

13. A drum truck according to claim 11 or 12,
wherein the recessed notch (15c) has a base parallel
with the upright rear flange (15a) and side edges
diverging from the base to the front edge of the
10 horizontal flange (15b), the upright plate having a
contour which follows the notch.

14. A drum truck according to any of claims 7 to
13, wherein the step is a transversely-extending tube
(14) which may be depressed by the operator's foot.

15

20

25

30

35

FIG. 1

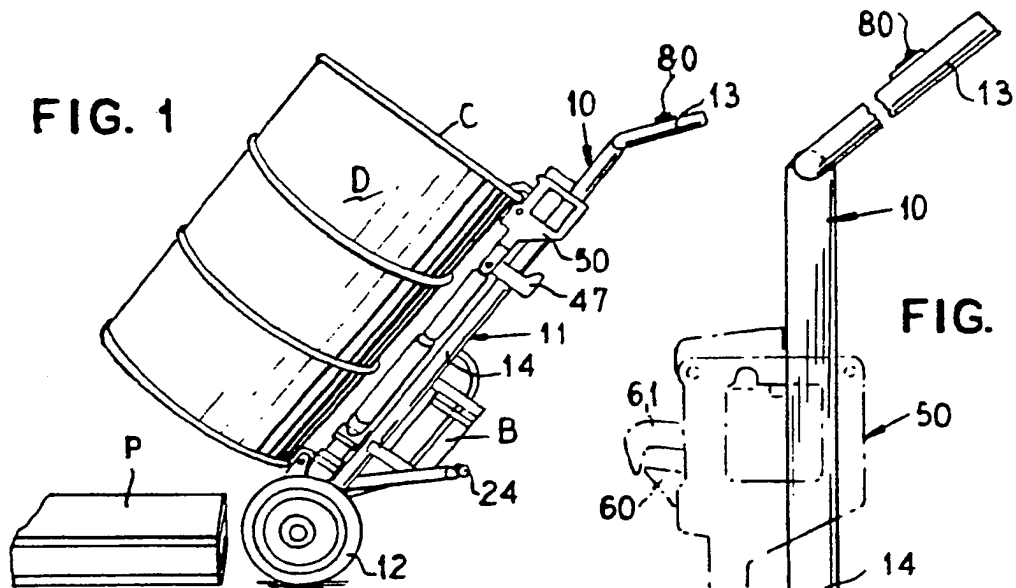


FIG. 2

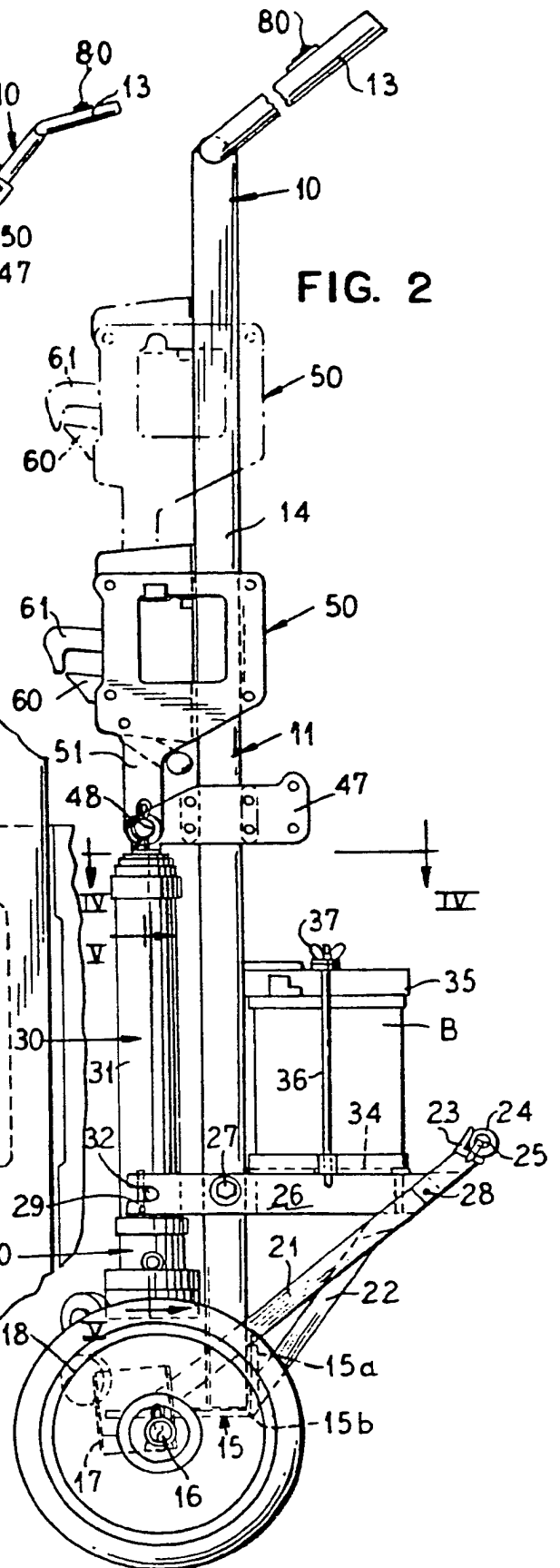


FIG. 3

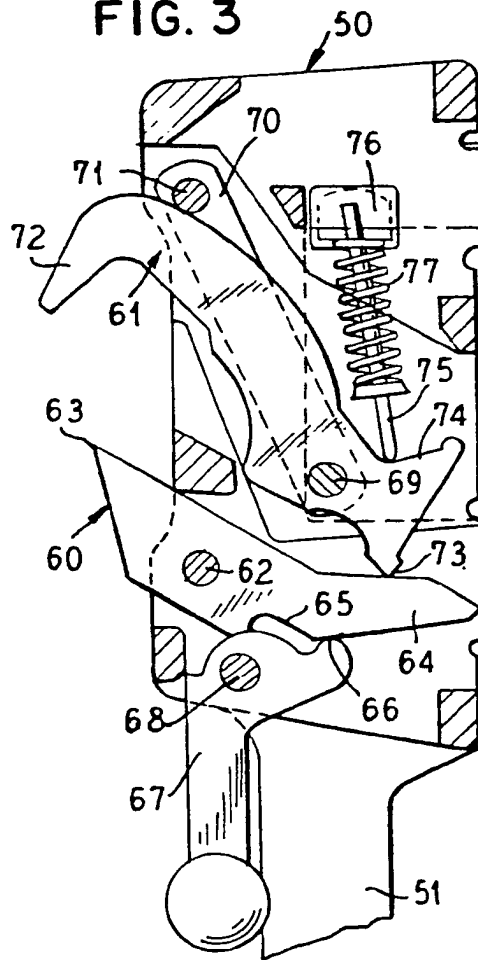


FIG. 4

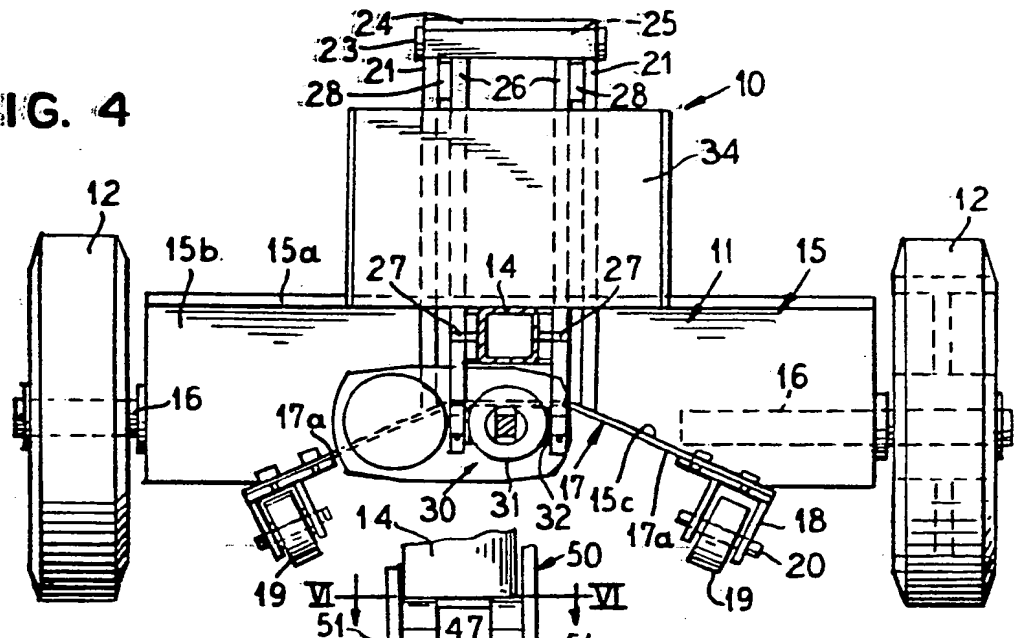


FIG. 6

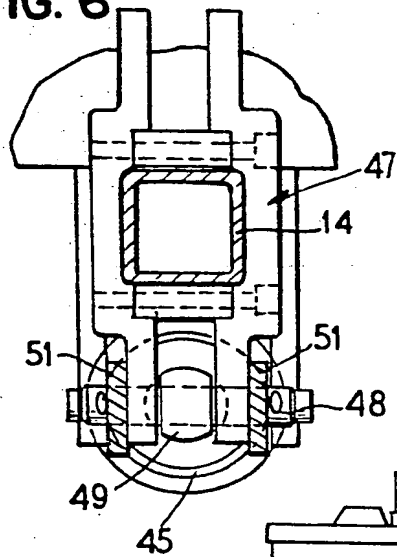


FIG. 5

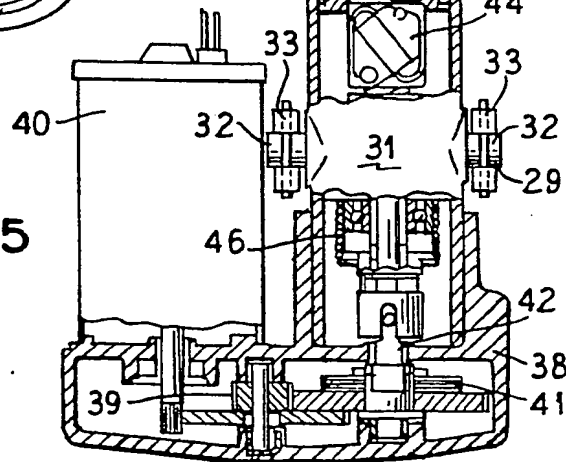


FIG. 8

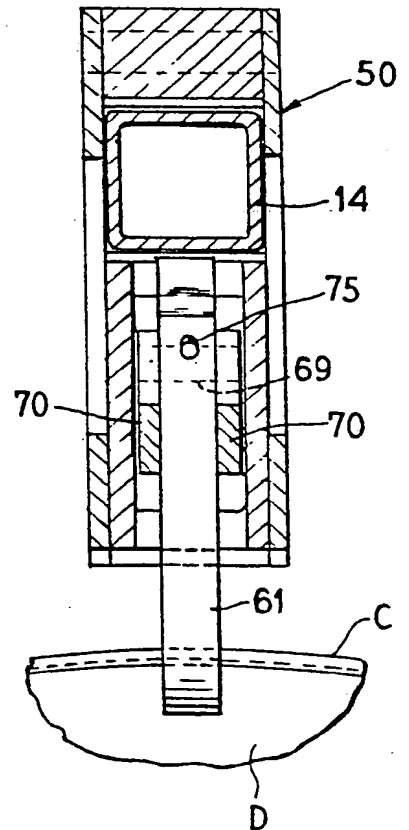


FIG. 7

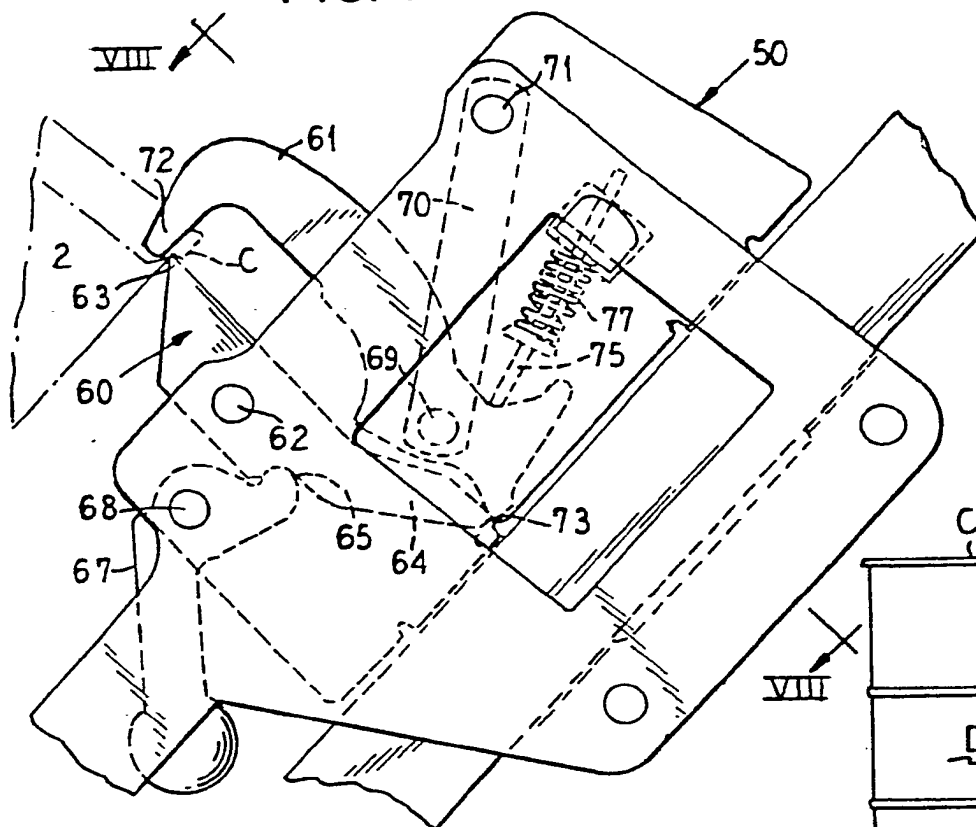


FIG. 9

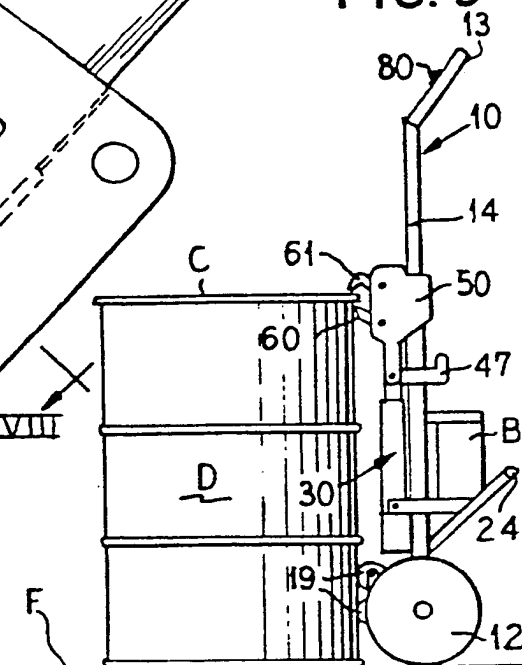


FIG. 10

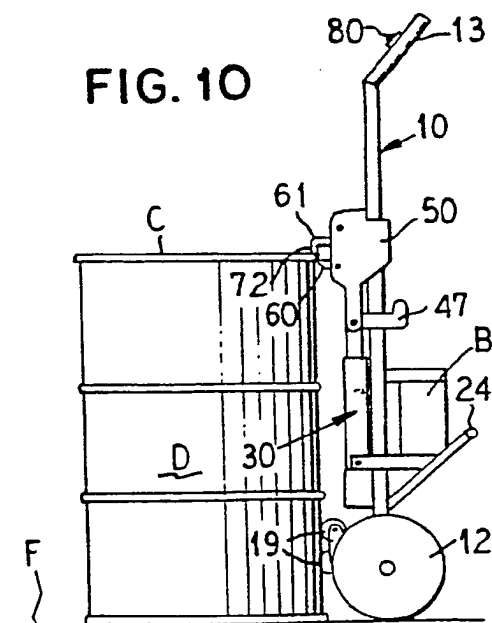


FIG. 11

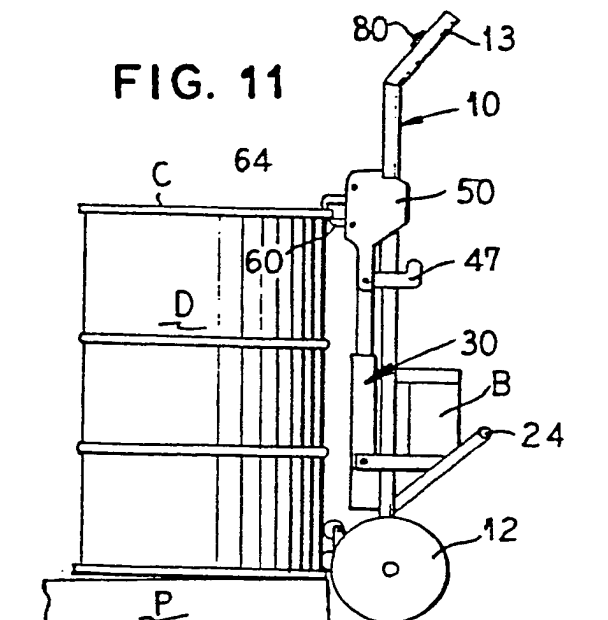


FIG. 12

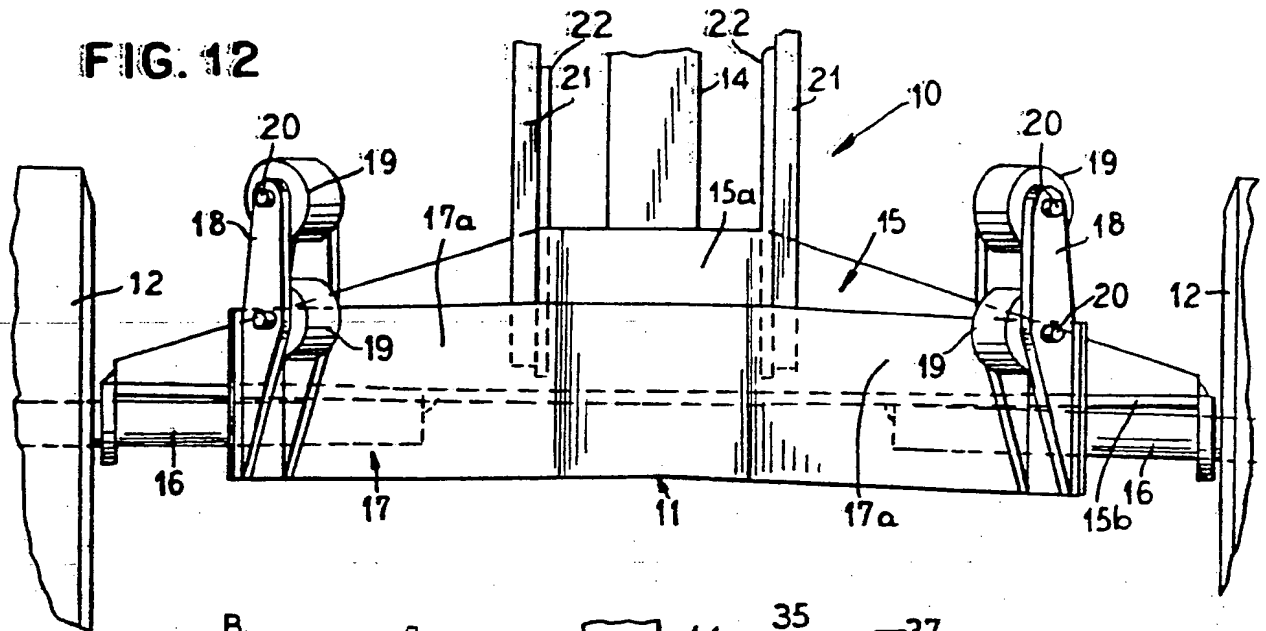


FIG. 14

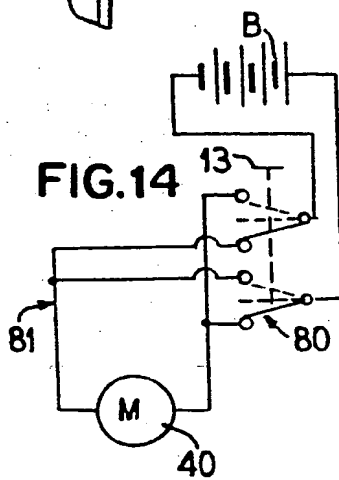
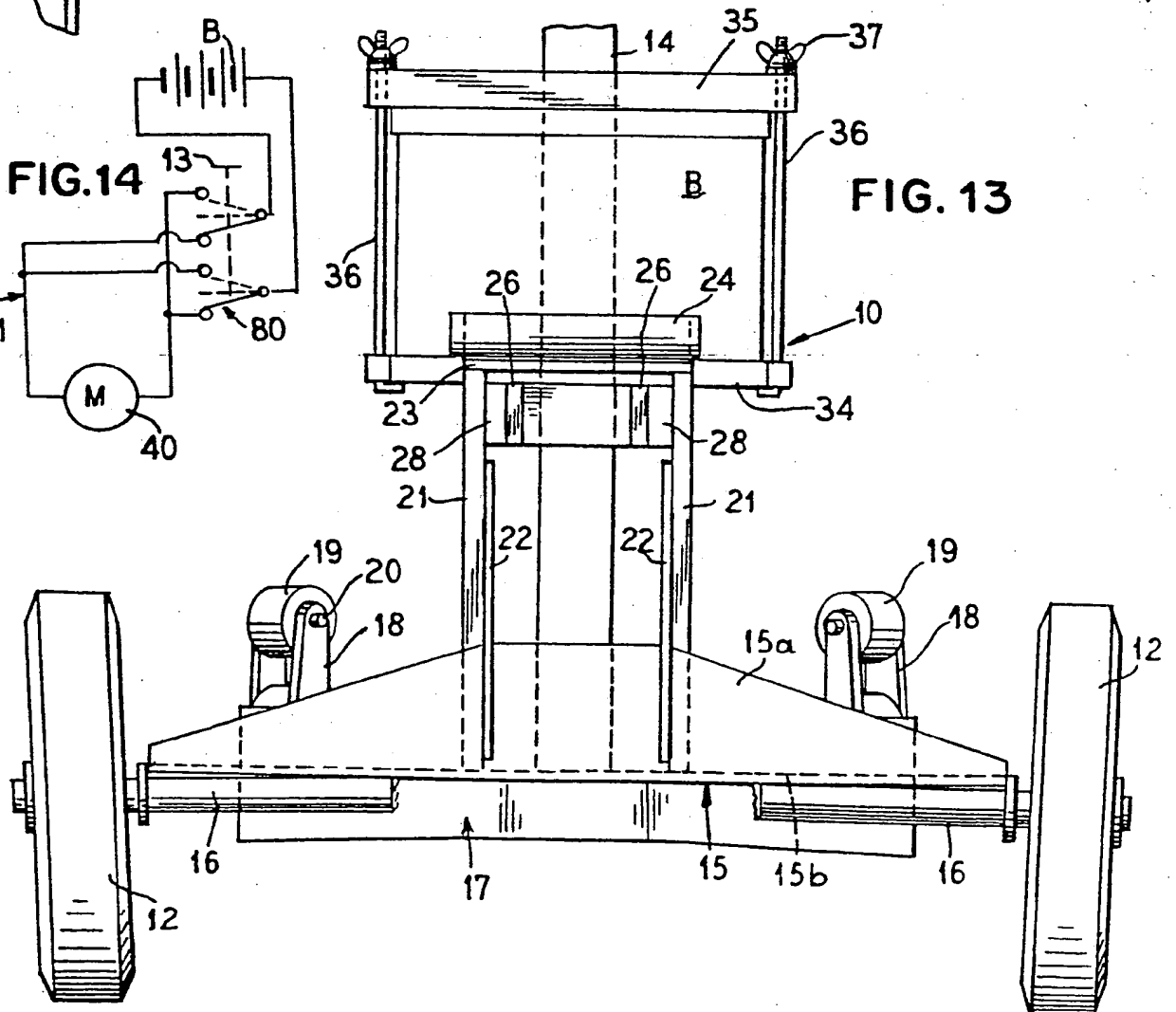


FIG. 13





European Patent
Office

EUROPEAN SEARCH REPORT

0240104

Application number

EP 87 30 0591

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl. 4)
X	US-A-2 905 347 (HOPFELD) * figures 1, 2; claim 1 *	1	B 66 F 9/06 B 62 B 1/14
A	---	3	
Y	US-A-3 907 138 (RHODES) * claim 1; figures 1, 2; column 6, lines 10-31 *	1	
A	---	2,3	
Y	US-A-2 814 403 (ERICSON) * figure 1; column 1, lines 65-70 *	1	
A	US-A-4 257 729 (MORISSETTE) * figure 9; claim 1 *	1,4,5,7	TECHNICAL FIELDS SEARCHED (Int. Cl. 4) B 62 B 1/00 B 66 F 9/00
A	US-A-2 360 858 (ERNST) * figures 1, 2; page 5, left hand column, lines 56-59 *	1,3	
A	US-A-2 895 567 (HALL) * figures 1, 2 *	1,2	

The present search report has been drawn up for all claims			
Place of search BERLIN		Date of completion of the search 09-07-1987	Examiner KANAL P K
CATEGORY OF CITED DOCUMENTS			
X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	

EPO Form 1503 03/82

**This Page is Inserted by IFW Indexing and Scanning
Operations and is not part of the Official Record**

BEST AVAILABLE IMAGES

Defective images within this document are accurate representations of the original documents submitted by the applicant.

Defects in the images include but are not limited to the items checked:

- ☐ BLACK BORDERS
- ☐ IMAGE CUT OFF AT TOP, BOTTOM OR SIDES
- ☐ FADED TEXT OR DRAWING
- ☒ BLURRED OR ILLEGIBLE TEXT OR DRAWING
- ☐ SKEWED/SLANTED IMAGES
- ☐ COLOR OR BLACK AND WHITE PHOTOGRAPHS
- ☐ GRAY SCALE DOCUMENTS
- ☐ LINES OR MARKS ON ORIGINAL DOCUMENT
- ☐ REFERENCE(S) OR EXHIBIT(S) SUBMITTED ARE POOR QUALITY
- ☐ OTHER: _____

IMAGES ARE BEST AVAILABLE COPY.

As rescanning these documents will not correct the image problems checked, please do not report these problems to the IFW Image Problem Mailbox.

THIS PAGE BLANK (USPTO)